# The Air Line Pilot

JUNE, 1953

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CAA Administrator Greets IFALPA Delegates

# IFALPA Report

## Pilot delegates of the free world join hands at their Eighth Conference to seek solutions to common problems.

ALPA played host to its first Conference of the International Federation of Air Line Pilots Associations during the week of April 6 when pilot delegates from fourteen nations of the free world met to discuss mutual pilot problems.

Countries represented at this, the Eighth Conference, were the United States, Great Britain, Australia, Belgium, Canada, Finland, France, Holland, Ireland, New Zealand, Rhodesia, the Philippines, South Africa and Switzerland. Greece was represented by proxy and Italy, presently a non-member of the Federation, had an observer present. Also present was Mr. F. Entwhistle, observing for ICAO. Climaxing a week of intensive work was the banquet held on April 9. Guest speaker was Fred B. Lee, Administrator of Civil Aeronautics.

The IFALPA met for the first time in April, 1948, in London, at which time an Interim Agreement was entered into by the thirteen nations then represented. At the September, 1948, meeting in Paris, the permanent Articles of Federation were signed. Subsequent meetings were: Dublin, April 4-7, 1949; Copenhagen, October 10-13, 1949; Brussels, April 17-20, 1950; Amsterdam, April 9-13, 1951; Sydney, April 15-19, 1952.

Reelected President of the Federation for the ensuing year was ALPA's head, Clarence N. Sayen. Captain L. H. Matthey of Aeropers (Swiss) was elected Vice President. Dennis Follows of Great Britain will continue to head IFALPA's Secretariat as its Secretary-Treasurer, and Captain C. C. Jackson continues to serve as IFALPA's Technical Secretary.

Prior to adjournment, it was decided that the Ninth Conference of the Federation should be held in Zurich, Switzerland, April 5 through 9, 1954.

Some of the Resolutions adopted at the Conference were:

### PHONETIC ALPHABET

The Conference adopted a resolution that the recently adopted ICAO phonetic alphabet be discontinued and the old "Able Baker Charlie" alphabet be reinstated during an interim period in which a working committee of ICAO consider revisions of the new phonetic alphabet which has proved to be unsuitable for world wide application. The resolution further urged that all member organizations of IFALPA approach their own governmental agencies to that end.

### LOCATION OF ILS BEACONS

The Federation adopted a resolution that at airdromes not equipped with ILS, the standard location of non-directional beacons be as follows:

1. **Single beacon installations. The non-directional beacon be sited one mile out on runway alignment.**
2. **Two beacon installations. One non-directional beacon be sited as in paragraph 1 above and the second four miles out on runway alignment.**

### SHOULDER STRAPS

For purposes of pilot protection, the delegates adopted a resolution "that all pilots' seats immediately be equipped with shoulder straps stressed together with the seat attachments to withstand severe deceleration forces."

### PERFORMANCE STANDARDS

IFALPA's active consideration of performance problems and its representation at ICAO Performance Committee sessions was further reviewed at the Chicago Conference and a policy resolution adopted on the establishment of performance standards. This resolution is:

**"WHEREAS IFALPA is conscious of the need for revised Performance Standards; and**

**"WHEREAS IFALPA is pleased to participate in deliberations pertaining thereto;**


Vol. 22, No. 6

**The Air Line Pilot**

**June, 1953**

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Published Monthly by The Air Line Pilots Association, International, Affiliated with A. F. of L. Publication offices: 55th Street and Cicero Avenue, Chicago 38, Illinois.

Advertising appearing in this magazine cannot be construed as being an endorsement by The Air Line Pilots Association or the Air Line Pilots.

Annual Subscription, $2.50

W. W. Anderson, Editor


**THE COVER**

The roving photographer gets a pre-banquet shot of Civil Aeronautics Administrator Fred B. Lee at the recent conference of the International Federation of Air Line Pilots Associations held in Chicago. With Lee are (left) Clarence N. Sayen, ALPA President, and (right) J. P. le Moel, the French delegate representing the Syndicat National des Officers de L'Aviation Marchande.

**"BE IT RESOLVED THEREFORE THAT such Performance Standards be not finalized until member organizations are satisfied that operational criteria used in their development have been confirmed by satisfactorily acceptable flight tests."**

## RUNWAY LIGHTING

In discussing the safety aspect of runway lighting and the varying illusions of height which are created by varying widths between rows of runway lights, the delegates at the Conference unanimously adopted a resolution requesting that ICAO attempt to standardize runway light row widths for future installations.

## AUTHORITY OF PILOT IN COMMAND

The assembled delegates, in their discussion of Annex 6 of ICAO's Standards and Recommended Practices for the Operation of Aircraft noted that though such standards provide for the investment of responsibility in the pilot in command for the operation and safety of the aircraft and for the safety of all persons on board during flight time such standards and recommended practices do not positively indicate that the pilot in command has the authority to exercise the responsibility given him. It was also noted that the omission of such statement of authorization has in the past given rise on numerous occasions to misunderstanding of the extent of the authority of the pilot in command, in controlling, for example, the entry of other than flight crew members into the flight compartment.

As a result of the discussions, a resolution was adopted unanimously that IFALPA request ICAO to inaugurate an additional standard in Annex 6 specifying that the pilot in command possesses the authority to exercise the responsibility invested in him in said Annex.

## POWER SOURCES FOR GYROSCOPIC BLIND-FLYING INSTRUMENTS

In view of the technical development that has taken place since 1948-49 when resolutions were adopted at the Paris and Dublin conferences on the subject of alternate power sources for gyroscopic blind flying instruments, the delegates at the Chicago Conference rescinded the earlier IFALPA action and adopted a resolution declaring its support for the standards laid down in ICAO Annex 8 which read:

**8.2.1.6. Instruments requiring a power supply. Mandatory instruments requiring a power supply (e.g., gyroscopic instruments) shall be provided with at least two independent sources of power.**

**8.2.1.7. Duplicate instruments. When any instrument is duplicated (e.g., an airspeed indicator or an altimeter) in order to comply with the Standards of Annex 6, two operating systems independent from each other shall be provided.**

## METEOROLOGICAL REPORTS FOR AIRCRAFT IN FLIGHT

On the matter of meteorological assistance to pilots, the Conference adopted the following resolution on weather reports:

**"THAT this Federation is of the opinion that actual weather reports should be available to an aircraft when it is three hours flying time from its destination; for this purpose it should be assumed that the aircraft is cruising at a ground speed of 250 knots."**

## HOLDING PATTERN

In the interest of standardizing holding patterns, the delegates adopted a resolution recommending that the "race-track pattern be adopted at all airports."

## ACCREDITED REPRESENTATIVES AT ACCIDENT INQUIRIES

Considerable discussion was devoted to the problem of obtaining authorization to permit accredited representatives of the State of Registry of aircraft involved in serious accidents to participate in the accident inquiries. As a result of this discussion the following resolution was adopted:

**"WHEREAS the ICAO Standards and Recommended Practices for Aircraft Accident Inquiry (Annex 13 to the Convention on International Civil Aviation) prescribe the procedure to be followed by States in inquiries into aircraft accidents involving death or serious injury; and**

**"WHEREAS the said Standards and Recommended Practices permit participation in the inquiry by an accredited representative of the State of Registry of the aircraft and advisers, the latter not excluding representatives of the operator; and**

**"WHEREAS pilot participation is regarded as being in the best interests of the efficient and impartial conduct of an inquiry; and**

**"WHEREAS at least one State has given permanent authorization to accredited members of the national pilots' organization to have free access to the scene of an accident for**

*(Continued on Next Page)*

Delegates attending the IFALPA Convention: (l. to r., first row) Mrs. Edna Ward, Secretariat; Mr. D. Follows, Secretariat; Capt. P. Siroux, Belgium; Capt. B. C. Frost, United Kingdom; C. N. Sayen, U. S. A.; Capt. R. C. Griffin, Rhodesia; Capt. F. Van Gass, South Africa; Capt. J. Woodman, United Kingdom; Capt. A. P. Ruige, Holland. (Second row:) F. Entwhistle, Observers; Mr. A. G. J. Piccardt, Holland; Capt. C. C. Harmon, Holland; F. Antonio Gatto, Italy; L. H. Matthey, Switzerland; C. G. Klimcke, United Kingdom; Capt. N. DeGuia, Philippines; Capt. R. B. Dodson, Philippines; Capt. C. C. Jackson, Secretariat. (Third row:) Capt. J. P. le Moel, France; Capt. J. E. Wood, U. S. A.; Capt. W. A. Wallace, Ireland; Capt. T. J. Hanly, Ireland; Capt. Wm. R. Masland, U. S. A.; Capt. D. W. G. Keesing, New Zealand; Capt. Morton, Australia; Capt. E. Ehanti, Finland; W. J. I. Montgomery, Canada; Mr. A. R. Eddie, Canada.

Fred B. Lee (center), Administrator of Civil Aviation, receives a welcoming handshake from ALPA's First Vice President, Jerome E. Wood of Eastern Air Lines at the recent IFALPA Conference held in Chicago. Others shown are: (left to right) F. A. Spencer, ALPA's Secretary; T. J. Hanly, and W. A. Wallace, both of Ireland.

## IFALPA Report

*(Continued from Previous Page)*

**the purpose of assisting in the examination of the wreckage;**

**"BE IT RESOLVED THAT member organizations of IFALPA approach their Governments for authority for accredited members to participate in aircraft accident inquiries, including the right of access to the scene of the accident for the purpose of assisting in the examination of the wreckage, with the ultimate object of international regulation by ICAO of effective pilot participation."**

### CARRIAGE OF RADIO TELEPHONIC EQUIPMENT

On the subject of radio telephonic equipment for aircraft flying the North Atlantic, the delegates at the Conference adopted a resolution reaffirming its previous resolution* on the subject and resolving further "THAT no telecommunications facilities be accepted by member organizations until such time as they have proved to be satisfactory in all respects."

***"Aircraft Radio Equipment—I.**

**THAT wireless telegraphic equipment shall be carried on all commercial flights except where radio telephonic facilities are satisfactory in all respects as shall be decided by the appropriate authorities in agreement with the pilots' association concerned.**

**"Such wireless telegraphic equipment shall include international distress frequencies.**

**"Aircraft Radio Equipment—II.**

**THAT whenever a pilots' association agrees with the appropriate authorities that radio telephonic facilities over certain routes or parts of routes are satisfactory in all respects, then other member organizations who may be affected shall be notified through IFALPA and be given pertinent details with a view to obtaining, if possible, uniformity of operation."**

The following Resolutions were adopted at the Conference but will require the ratification of the member organizations prior to their formal adoption and implementation:

### AIRCRAFT PERFORMANCE MINIMUM

**"On the assumption that eventually future requirements will be based on the rational concept of performance and that ICAO Annexes 6 and 8 will be changed fundamentally,**

**"IT IS RESOLVED THAT Recommendation 11 of ICAO Doc. 7060 as amended by the single paragraph below be inserted in ICAO Annex 8 as a Standard—**

> **"The performance shown in the Aeroplane Flight Manual shall constitute the average available for the type of aircraft therein designated."**

### THREE ENGINE FERRY FLIGHTS

**"WHEREAS three engine ferry flights may involve a stage of operation in which the aircraft will become uncontrollable in the event of failure of a critical engine; and**

**"WHEREAS any such critical engine failure may render ancillary equipment unservicable; and**

**"WHEREAS climb out performance may be nullified; and**

**"WHEREAS special techniques may have to be employed;**

**"BE IT THEREFORE RESOLVED THAT no regular line pilot be ordered or accept orders to participate in any such operations.**

**"As any agreement of an individual pilot will depend on the policy of his national association, BE IT FURTHER RESOLVED THAT all member organizations formulate a policy and file with IFALPA a statement of that policy."**

IFALPA's Secretary, Dennis Follows, draws an appreciative chuckle from ALPA's President, C. N. Sayen. Facing camera, (right) is C. C. Jackson, IFALPA's Technical Secretary.

# First Air Safety Forum

## Hard-Working safety representatives tackle a formidable agenda at the Association's initial safety meet.

Reports from industrial and federal agencies confirm the success of ALPA's First Annual Air Safety Forum which was held in Chicago April 1-3, 1953, at the Sherry Hotel.

Attending as delegates to the Forum were the Central Air Safety Chairmen from each air line, as well as special ALPA committee representatives present to report on the activities and accomplishments of their respective committees. Over 50 pilot delegates attended.

Conceived in the minds of ALPA's Engineering and Air Safety staff representatives who had long felt that air safety issues should be given more specific attention than is possible at ALPA's biennial conventions, the Air Safety Forum brought together outstanding technical representatives from all fields of aeronautical engineering.

Guest speaker at the banquet was Ben O. Howard, Aviation Consultant and test pilot, who enlarged on his controversial paper entitled, "The Greater Attainment of Safety."

Industry representatives who addressed the Forum were:

Jack Carran, CAA Chief Aerodynamist, speaking on "Rational Performance Standards."

William I. Stieglitz, Design Safety Engineer, Republic Aviation Corp., speaking on "The Complexities of Simplification."

J. B. Fornesaro, Chief of Flight Test, Boeing Airplane Co.—"Turbo Jet Aircraft Operations."

Irvin Pinkle, NACA Research Specialist, who presented NACA Fire Films for the delegates.

The Air Transport Association was represented by Craig F. Timmerman. The CAA was represented by John A. Canon, George W. Haldeman, Jack Carran, and George Vest. The CAB was represented by J. T. Rinker, proxy for John M. Chamberlain. L. M. Sherer of RTCA and W. P. Person of Flight Safety Foundation were in attendance. Also present were C. M. Christensen of UAL and Otto Kirschner of AA for the airlines; R. G. Scigliano for the University of Chicago, K. L. Burroughs for Aero. University and Curtis Le Fever for the U. S. Coast Guard Geographical Survey. For the press: Alexander McSurely representing Aviation Week and Wayne Thomis representing the Chicago Tribune.

Special reports and papers prepared by ALPA technical representatives were presented and discussed by the delegates.

These presentations were:

J. D. Smith (CAP)
ALPA N. Y. Regional Air Safety Chairman
"Regional Air Safety Program" and "Air Noise Abatement"

H. H. Mouden (BNF)
ALPA Kansas City Regional Air Safety Chairman
"Regional Airspace Subcommittee"

W. W. Owen (EAL)
ALPA Atlanta Regional Air Safety Chairman
"Accident Investigation"

H. L. Jacobson (UAL)
ALPA Central Airline Safety Chairman
"Central Air Line Safety Problems"

H. G. Portman (UAL)
ALPA Central Engineering Chairman
"Cockpit Standardization"

First Report of ALPA Performance Committee
W. W. Moss (PAA)—Chairman
J. P. Talton (EAL)—Member
J. A. Durham (AAL)—Member

R. A. Stone (UAL)
ALPA Committee Chairman
"Aircraft Exterior Lighting"

V. H. Brown (AA)
ALPA Committee Chairman
"Fire Hazards Committee"

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"Benny" Howard (left), leading U. S. Aviation Consultant, stresses a point at ALPA's Air Safety Forum banquet. Listening attentively is ALPA's President, Clarence N. Sayen (right). The gentleman (center) as of publication date remains unidentified.

## Congratulations

". . . I would like you to know that in some 23 years of attending various maintenance, engineering, and safety conferences your forum impressed me as being outstanding. I fully enjoyed it, learned a lot, and appreciated the opportunity to attend.

"Your organization is doing an excellent job and I wish you the best of success in the solution to your many problems concerning air safety."

*K. L. Burroughs, President*
*The Aeronautical University*

"I feel the Forum was very worthwhile and a great deal was accomplished. The Forum very definitely pointed out the magnitude of the safety problem both from an operational as well as an economical standpoint. It is gratifying to see the manner in which the safety representatives discussed their various subjects."

*William P. Person*
*Flight Safety Foundation*

"I also wish to congratulate you on the inauguration of a function which will result in the appreciation of safety in air transport.

"I am very happy to see the many members of your organization who are being invited to participate in industry committees. Such association will certainly result in the mutual solution of our common problems."

*Otto E. Kirchner*
*Director of Operational Engineering*
*American Airlines*

# The Complexities of Simplification

An address delivered by Republic Aviation's noted design engineer, William I. Stieglitz at ALPA's Air Safety Forum.

### Introduction

During the past year, the increased complexity of aircraft has been the subject of a great deal of discussion. There is no question that simplification is desirable; in attempting to achieve it, however, a differentiation must be made between needless or harmful complexity and that complexity which serves an essential purpose.

Complexity in and of itself is not necessarily an evil. Our entire civilization and mode of living is based on mechanical complexity. An automatic washing machine is much more complex than a washboard and tubs; modern telephone and telegraph systems require more complex equipment than did the pony express. In these cases, and in countless others, mechanical equipment which is extremely complex has made the process of living less complicated. Similarly, in many cases extremely complex mechanical equipment in an airplane may make the operation of that airplane less complicated. The real question, then, is not whether the modern airplane is complex, but whether it is unnecessarily so, and as a result loses in utility, reliability and safety.

### Complexity, Utility and Safety

The equipment needed for instrument flying and long range navigation is mechanically complex, yet has increased the safety of flying, and has also extended the usefulness of the airplane. Similarly, the equipment necessary for ILS approach has added mechanical complexity, yet how many pilots would be willing to remove this equipment and go back to making circling approaches under an overcast? How many would go back to flying a DC-3 over the Rocky Mountains, as compared to flying a pressure-cabin airplane; yet cabin pressurization adds to the complexity of the airplane.

Each such increase in complexity, which in turn has extended the utility and increased the safety and the comfort of the modern airplane, has involved the installation of additional instruments and controls, making the pilot's problem more complex. At the same time, the increase in the speed of aircraft has, in many circumstances reduced the amount of time available to the pilot to perform any given function.

### Complexity and the Pilot's Task

The airplane is one part of a man-machine combination. Therefore, the important question is not whether the machine is complex in itself, but whether the man-machine combination can function efficiently. We have not gained in over-all simplicity if, by extreme simplification of the machine, we complicate the situation for the human operator to such a point that we approach or exceed his basic limitations. It is often necessary to complicate the machine to simplify the pilot's task. When a pilot must go through a complicated sequence of control minipulations to perform a comparatively simple function, it will usually be found that the mechanics of the system is too simple; that had the system itself been made more complicated its operation by a single control might have been possible.

### Simplification Through Complexity

An illustration can be found in the emergency landing gear extension system of early F-84 airplanes, and in almost identical systems which are installed in other fighter aircraft. The main landing gear, in this case, will drop by gravity. Because of space limitations, the nose gear retracts aft, and drag prevents its dropping to locked position. Since a hand pump was needed for ground servicing of the hydraulic system, and for operating other units in an emergency, the simplest way of providing for emergency extension of the nose gear was to use this pump, drawing from the emergency hydraulic supply. In order to reduce the amount of pumping required, a selector valve was added to isolate the nose gear system from the rest of the hydraulic system.

To achieve emergency extension of the landing gear with this system, it was necessary for the pilot to place the landing gear selector handle in down position, and then pull the emergency up-lock release. Following this, the selector valve was placed in "Nose Wheel" position, and the pilot pumped the nose gear down. After this was accomplished, if the pilot wanted to lower the flaps the selector valve had to be returned to its normal position, the landing gear handle returned to neutral, the flap handle placed down, and the hand pump used to extend the flaps. It might be pointed out that nose gear extension took eight to ten strokes of the pump. Another manufacturer further simplified a

### About the Author

**William I. Stieglitz is Design Safety Engineer at Republic Aviation Corporation. He graduated from the Massachusetts Institute of Technology's class in Aeronautical Engineering. He is an Associate Fellow of the Institute of Aeronautical Sciences and the Royal Aeronautical Society. Stieglitz came to Republic as a design engineer in 1944 from Fleetwings where he had been Chief of Aerodynamics and Flight Testing. He has been Design Safety Engineer at Republic for the past seven years. A member of the NACA Committee on Operating Problems, he also serves on the Aircraft Fire Prevention Committee. In 1952 he was the co-recipient, with Republic Aviation, of an industry award for "distinguished service in achieving safer utilization of aircraft."**

similar system by eliminating the hydraulic selector valve. The result of this simplification was that ten times as many strokes of the pump were required to lock the nose gear down.

It is rather obvious that the procedure described above was time-consuming. As a result, pilots experiencing engine failure at low altitude often did not have time to get the nose gear locked down before touch-down, and

**Then . . .**

**Simplicity**

the gear collapsed on landing. On the other hand, pilots who had sufficient altitude tended to extend the gear early. With a dead engine, the resulting additional drag of the gear often caused the pilot to undershoot. Besides these two conditions, an error was frequently made in one step or another of the complicated sequence of operations.

This situation was corrected by complicating the airplane. An emergency pneumatic system was installed in such a manner that pulling the emergency gear handle operated the necessary valves and discharged a high-pressure air bottle into the nose gear extension cylinder. In the later aircraft incorporating this system, the pilot need only place the landing gear selector handle in down position and pull the emergency up-lock release. All three elements of the gear extend and lock in a matter of seconds. It is true that, in incorporating this pneumatic system, complexity and weight were added to the airplane; the system was made more complex, yet the net overall result was greater simplicity.

The dimming of cockpit warning lights affords a further example of mechanical simplicity which produced control complexity and loss of safety. The need for dimming such lights is obvious, since lights which are bright enough to be seen in the daytime are too bright at night. The standard method of providing control, up to the present time, has been by means of individual hoods on the lights. There have been many instances of pilots failing to make sure that all warning lights were full bright, prior to take-off in the daytime. Accidents have resulted because the pilot subsequently failed to see a dimmed warning light.

Accidents of this kind will be prevented by the added complication of a master dimming switch, such as has recently been adopted as standard by the Armed Forces. With this system, all warning lights are full bright when the cockpit lights are off, and are dimmed automatically to the proper level for night flying when the cockpit lights are turned on. An override switch is provided which permits the pilot to turn the warning lights back to bright, when he is using cockpit lights in the daytime to relieve sky glare. The override switch is automatically reset when the cockpit light switch is turned off. The complexities of such a system are apparent; so also are the increased safety, and the control simplification.

### Automatic Systems

Automatic systems represent even greater complexity aimed at simplifying the pilot's task. Many pilots object to automatic controls because of experience with systems which were subject to malfunction, and left them without adequate control, or without sufficient warning to permit them to assume control. Criticism of such systems is thoroughly justified. Nevertheless, in many cases the answer is not to be found in throwing out automatic control systems, and thus imposing an excessive burden on the human operator. Instead, the automatic system should be made as reliable as possible, and should incorporate adequate warning devices. Further, provision for mechanical override is imperative, if functioning of the system is essential to safety. Such systems must be so designed that their operation is as simple as possible, they are easily maintained, and, insofar as is possible, they "fail safe."

An example of the use of an automatic system to simplify the pilot's task, and to eliminate a recurrent "pilot error," is found in the fuel systems of most modern fighter aircraft. In the conventional fighter of World War II, fuel systems consisted of numerous individual tanks, with manual selection. Errors in the use of this type of system were common. Pilots would switch to an already empty tank instead of a full one, leave the selector in an intermediate position, or, at times, allow a tank to run dry before switching.

To eliminate the possibility of such errors, the fuel systems of present-day fighters are designed so that fuel to the engine is fed from a single main tank, and the fuel from all other tanks transfers automatically to the main. With such a system, a pilot turns his fuel selector to an all-on position, and, barring an emergency or malfunction, need never touch it again.

This system is obviously more complex than the old type. Transfer pumps, fuel level control valves, and shut-off valves are needed. Provision is also needed to permit transfer of fuel to the engine directly from tanks other than the main, in case of a malfunction. It is true that malfunctions of such systems have occurred. Fuel level control valves, particularly in the early days of their development, were a persistent source of trouble. Accidents have resulted from malfunctions of this system, yet they are fewer in number than those which occurred with the old manual system. Here again,

**Now . . .**

**Complexity**

mechanical complexity has simplified the pilot's task, and eliminated a known major cause of accidents.

### Harmful Complexity

The types of complexity discussed so far serve an essential purpose, in increasing the usefulness and safety of the airplane. In contrast, there is needless complexity which adversely affects reliability. Operational reliability re-

*(Continued on Next Page)*

quires not only that there be a minimum possibility of malfunction, but also ease of inspection and maintenance. Needless complexity reduces over-all functional reliability and complicates the problems of maintenance. Every system must be made as simple as possible, consistent with its operational and control requirements. If a simple mechanical system will do a given job, there is no reason to install a complicated hydraulic system to do it. In one case of which the author knows, a hydraulic system involving twenty-three valves, many of which had to operate in sequence, was installed in an airplane to perform a function which could be performed adequately by a simple mechanical strut, operating off an eccentric. Such use of hydraulic actuation is the type of needless complexity which must be avoided. The use of an electronic circuit, with its tubes, amplifiers, relays and other devices, when a direct electrical or mechanical system would serve, falls in the same category. This kind of complexity serves no useful purpose, adds weight and cost to the airplane, decreases functional reliability, and complicates maintenance.

The use of automatic controls when they do not serve an essential function is another form of needless complexity. Take, for example, a switch which should be turned on before take-off, when the pilot has plenty of time to check. If leaving the switch in "off" position will not critically affect safety, there is no reason to provide automatic control. If, however, failure to operate the switch may precipitate an emergency at any time during the flight, either an automatic system should be installed, or the pilot must be given adequate warning that the switch has been left in "off" position.

### Emergency Systems

The same type of approach must be used in evaluating the need for duplicate emergency systems. It has been argued that any such system is needless complexity; that primary systems should be so reliable that duplication is unnecessary. Obviously, this would be the ideal state, but would imply a state of perfection not yet attained by man. Even though every effort must be made, and is being made, to make primary systems reliable, the possibility of human error in design, fabrication and maintenance is always present. Absolute reliability in systems and components cannot be expected; failures can and will occur, despite our best efforts to prevent them.

It is true that through long years of development some items of equipment have reached a point of reliability that failures between regular overhaul periods are an extremely rare occurrence. Duplication of such items is obviously unnecessary. On the other hand, there are many systems of which this is not true. For example, in a fluid-carrying system, with its fittings and flared tube ends, there is a definite possibility of failure as a result of faulty material, fabrication or maintenance. In such cases, the consequences of failure must be carefully analyzed; if it will adversely affect the safety of the airplane or its occupants, a duplicate system for emergency operation must be provided.

There are many instances where this need is evident. The provision of an alternate power source for gyro instruments falls in this category, as the consequences of a loss of these instruments under adverse weather conditions would be disastrous. Primary flight controls involving hydraulic boost are in the same category. A failure of the primary system would mean loss of the airplane, and there can be no question as to the need for either a duplicate hydraulic system, or other means for the pilot to maintain control. To depend solely on the reliability of the primary system, no matter how carefully it is designed and maintained, would be totally unrealistic.

Most cases, unfortunately, are not as clear-cut as those discussed above, and these are the ones which become controversial. Here, a thorough analysis of all factors involved must be made, to determine whether a duplicate system is necessary, or would be merely needless complexity. For example, whether or not an emergency landing gear extension system is necessary depends on whether the necessity of making a belly landing, every time a failure of the primary system occurs, is acceptable. The consequences are the risk of injury to personnel, and possible total loss of the airplane, or, at best, the cost of major repairs and loss of use of the equipment. For a transport airplane, it is certain that the risk would not be acceptable to the public. For the military airplane, with the increased possibility of primary system failure as a result of combat damage, we cannot afford the cost, either economically or logistically. The increase in performance which would result from the amount of weight saved by omitting the emergency system is not worth the cost. Therefore, installation of an emergency extension system is required.

An analysis of all factors, such as outlined above, must be made of the need for any duplicate emergency system. If such an analysis indicates that an emergency system should be installed, every effort should be made to avoid needless complexity in the system itself. It should be emphasized, however, that in such systems the need for control simplicity, and speed and reliability of operation, is of greater importance than mechanical simplicity.

The design of the system must be such that no single failure can make both primary and emergency systems inoperative. One point sometimes overlooked in this regard is the possibility of a failure of the emergency system inducing a failure of the primary system. Compliance with these principles often requires added complexity.

An emergency system, installed to safeguard against one type of failure, is of questionable value if a new hazard is introduced through possible malfunction of the emergency system itself. There have been cases where misuse of the emergency system has created such a condition. This does not necessarily dictate removal of the emergency system. Instead, an evaluation should be made of the relative severity of the hazard eliminated and that introduced, and the emergency system should be studied carefully to see whether, possibly by a slight increase in complexity, the secondary hazard cannot be eliminated.

### Complexity and Progress

Much of the complexity of the modern airplane is essential to its ability to serve its purpose, and cannot be eliminated without destroying that ability. We must, in fact, be ready to accept an increasing amount of complexity of this type, if aviation is to continue to develop. For example, the problem of mid-air collision is already pressing, and with the increasing speed of airplanes, will become acute in the very near future. With increased closing speeds, the range of human vision is insufficient to give the pilot adequate warning. Since we cannot change this human limitation, we must install additional equipment, such as collision warning radar. This is only one example of the added mechanical complexity which will be inevitable unless we are ready to say there will be no further improvement in the airplane; that we are satisfied with its present utility, speed and safety. If

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# Terrain Avoidance

**TWA Capt. Dean Phillips, ALPA's representative on the Air Coordinating Committee's Special Working Group 10, outlines a report on his Committee's activities, first presented at the Air Safety Forum.**

The formation of Special Working Group No. 10, on which ALPA has representation, was formed by the Air Coordinating Committee Navigation Panel to:

1. Study the over-all problem of terrain avoidance and all procedures, navigation aids, operational practices, planning and development pertaining thereto.
2. Study the common system planning with the view towards determining whether sufficient emphasis has been given to terrain avoidance and recommend accordingly.
3. Determine whether or not an emergency position checking (Terrain Warning) device is necessary.
4. Recommend procedures, equipment, development and operational requirements which will lead to improvement in the avoidance of terrain in the operation of aircraft.

Special Working Group No. 10 is made up of the following members:

Robert F. Gates, C.A.A., Chairman
L. W. Burton, Jr., Air Coordinating Committee, Secretary
John Apuli, C.A.A.
Edward G. Pennock, C.A.B.
David C. Trafton, Dept. of Air Force
Frank Comer, Dept. of Navy
Sam Saint, ATA
Dean L. Phillips, ALPA

The final draft of the committee's report should be on its way to the Air Coordinating Committee Navigation Panel within the next few weeks. This will conclude our work of the past year.

The scope of activity of SWG 10 includes an analysis of twenty-five major terrain collision accidents of civil aircraft and an educated guess of how many of these accidents might have been prevented if the pilot had had the use of (a) airborne radar, (b) improved navigational aids, (c) terminal area surveillance radar and GCA, (d) a reliable airborne terrain warning device. It is my desire to have improved air traffic and approach control procedures added to the list.

It was the opinion of the Committee that all the terrain collisions but one or two possibly could have been prevented if the pilot had heeded the warning of a reliable terrain warning device.

We are all aware of what we presently have to work with. Now, what can we expect to have in the future and what are the advantages and limitations of the devices and systems mentioned? Installation of airborne radar on civil aircraft is believed to be at least two years away and then only on a voluntary basis. The development of a bright tube display to permit daytime useage without a viewing hood is one of the major holdbacks to the installation of airborne radar on air carrier aircraft today. Other determining factors are the weight of the radar unit and the cost of installation.

Airborne radar for civil aircraft will be developed primarily to help the pilot avoid dangerous weather. As pointed out in Mr. Sam Saint's recent article in the Air Line Pilot, terrain warning information will be a by-product of airborne radar. Below 1,500 feet above the ground, airborne radar loses its effectiveness as a terrain warning device. However, above this altitude, dangerous terrain is pictured to the pilot in such a manner that it tells him from which direction he is approaching the terrain and which way to turn to avoid it. Airborne radar, since its inception, has been successfully used as an aid to navigation and is especially useful over terrain which has lakes, mountain peaks, rivers, and other distinctive topographical features or when used in conjunction with radar beacons.

As higher speed aircraft are put into service and as traffic increases, the danger of mid-air collisions of aircraft operating without traffic separation becomes a real hazard. This is a constantly increasing collision hazard which demands a solution now.

The proposed airborne radar for civil aircraft will not necessarily provide the pilot with a means to avoid other airborne traffic. The SWG 10 Committee, although not directly concerned with this problem, felt this hazard should be mentioned in our report.

Terminal area surveillance radar and GCA will provide the pilot with navigation and traffic information in the localized areas where it is or will be installed. The weakest links in terminal area surveillance radar is the lack of altitude information and a quick and positive means of identifying airborne targets.

The identity problem possibly may be solved by equipping aircraft with radar identification beacons or with VOR and DME so the pilot can supply this information.

Surveillance radar can be used to provide the pilot with additional information—the location of tall television towers. One thousand to fifteen hundred foot towers will not be uncommon in the very near future. Again, it is pointed out this radar service will be localized.

Throughout the country today, VOR (omni) stations now provide navigational aid to those pilots who are flying aircraft equipped with VOR receivers. It is hoped the weaknesses of the VOR ground and airborne installations will be solved before the Victor airways, air traffic control, and approach control systems are extensively used.

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VOR, combined with Distance Measuring Equipment (DME), will provide the pilot with continuous position information and will permit air traffic control to use by-pass routes around areas where there is heavy terminal traffic and will also permit the pilot to navigate over dangerous terrain safely. During a field trip, the committee members had an opportunity to observe the Distance Measuring Equipment in operation, and its accuracy was most impressive.

Another aid to navigation, the operation of which was observed during a field trip, is the Pictorial Computer. The Computer gets its sensing information from the VOR and DME installations and presents visual track and position information to the pilot. It is pointed out that both the airborne and ground installations must be properly functioning before the Pictorial Computer will work.

While I agree with the Committee that a pictorial presentation of navigation information is desirable, a Pictorial Computer duplicates information already available to the pilot if his aircraft is equipped with a functioning VOR and DME installation. In addition, the Pictorial Computer requires considerable space to locate a scope upon which a navigation chart is either placed or projected. It is doubtful that space can be found on the flight deck or justifiably used for a pictorial computer scope to duplicate navigational information already available to the pilot. Also, it is of utmost importance that engine and flight instruments be located where they can be easily read and monitored. Present test installations have sacrificed the location of engine and/or flight instruments in favor of the pictorial computer scope.

Accurate and reliable navigation aids are necessary to the safe movement of air traffic, but this is not enough. Accurate and reliable altitude or terrain clearance information is also necessary.

Only two or three air carriers are currently using a terrain warning device. The Hughes Obstruction Warning Radar and early models of radar altimeters are the only forms of terrain warning devices that have been service tested or used by the air carriers.

The Hughes terrain warning indicator has limitations and weaknesses, but is most certainly better than nothing at all. The device is a modification of

*(Continued on Page 15, Col. 2)*

## BAROMETRIC ALTIMETER ERRORS

The errors of the pressure altimeter are, and have been common knowledge to the air transportation industry for a number of years, and yet sufficient effort has not been made to provide the pilot with an altimeter that is not subject to false indications.

The magnitude of these errors when added, could have been the contributing cause of a number of aircraft collisions with mountainous and hilly terrain.

To briefly review altimeter errors, there are four which are generally mentioned in text books and industry publications:

1. Horizontal pressure gradient error, which is caused by difference in pressure in the same or different air masses.
2. Air temperature error, caused by the calibration of the altimeter at a standard temperature of 59° F. at sea level.
3. Local mountain effect.
4. Instrumental error, such as lag, error caused by mechanical linkage, etc.

Two major errors seldom compensated for are the ones caused by temperature and local mountain effect.

The temperature error is easily determined on any navigation computer, yet it could be of such sizeable amount that it could cause traffic conflictions of serious consequences if one pilot compensated for the temperature error and others did not. The errors shown below are not exact, but include any plus or minus interpolation error when the readings are taken from a standard navigation computer. A temperature of 20° C. below standard is used for all altitudes listed.

| Indicated Alt. | Actual Alt. | Error |
|---|---|---|
| 3,000 | 2,800 | 200 |
| 5,000 | 4,640 | 360 |
| 10,000 | 9,250 | 750 |

The local mountain effect is caused by the acceleration in a mass of air as it is squeezed through a pass or over a ridge. The pilot has no means to determine the magnitude of this localized low-pressure error, which, again, could be sizeable.

Pending receipt of the results of the actual test conducted by the NACA on altimeter error caused by orographic lifting, the following mathematical chart taken from TWA bulletin No. 47-149 shows the calculated error in feet with the corresponding wind differentials:

| Velocity of Wind Over Ridge | | | | | | |
|---|---|---|---|---|---|---|
| MPH | 25 | 50 | 75 | 100 | 125 | 150 |
| 25 | | 63 | 168 | 313 | 505 | 736 |
| 50 | E | | 106 | 250 | 437 | 670 |
| 75 | R | | | 143 | 331 | 565 |
| 100 | R | | | | 187 | 420 |
| 125 | O | | | | | 228 |
| | R | | | | | |

Example: If a pilot maintained his indicated altitude in an air mass that was accelerated from 25 MPH over flat terrain to 150 MPH over a ridge or through a pass, his actual altitude would be 736 feet lower than the altitude indicated.

Now that pressurized aircraft are descending 1,000 to 2,000 feet per minute, altimeter lag error may amount to 200 feet or more.

When all the errors of the pressure altimeter are added, their magnitude is so great that altimeter errors cannot be discounted as the probable cause of a number of aircraft collisions with the terrain.

*The above barometric altimeter error report, authored by ALPA Representative Dean Phillips, was incorporated by the Air Coordinating Committee's Special Working Group 10 as an appendix to its final committee report. Just prior to press time, Captain Phillips reports several additional factors causing barometric altimeter errors. This material follows:*

Both the military and civil branches of the aviation industry have expressed concern over the lack of positive vertical separation at indicated altitudes of 25,000 feet or more. The barometric pressure altimeters presently being used are subject to scale error and installation error, both of which increase with altitude. Available information indicates that the existing scale error limits are established as follows: 50 feet at sea level; 100 feet at 5,000 feet; 150 feet at 10,000; 200 feet at 15,000; 375 feet at 25,000; 525 feet at 35,000 feet. Combined scale and installation errors may result in an aircraft being 1,000 feet off the indicated altitude at 35,000 feet.

General Mills Laboratories is one of the companies which has a new-type pressure altimeter under development. The General Mills altimeter is reported to be self compensating for temperature variations and also may provide an answer to positive vertical separation in the higher altitude ranges.

Did You Ever Make

# A Trip to the Home Office

**Elmer Glutz (pen name) did. Read this unexpurgated version of his soul-searing experiences. Any resemblance of his "characters" to persons living or dead is strictly incidental.**

Few people in this life are ever fortunate enought to experience the wonderful event that has occurred to me. If death should claim me tomorrow, I could go to my reward fully satisfied with my "footprints on the sands of time." What good transpires in the remainder of my waning days will have to be second-rate. I have lived. I have been to the home office.

For 18 of my 20 years with the company I was a baggage handler. Now for the past two years a Lead baggage handler. Both jobs are identical in pay and duty but the title puts me in management class. I would have you know I can attend management clubs, have pass privileges (one per year) and enjoy other rights which employees under Union domination are denied. That is how I came to fulfill my life's ambition of visiting the Home Office.

For ten years I saved, foregoing cigarettes, beer and girls for the day I could afford the trip. It was not easy but such virtue has its reward. Since it was winter and a slack period my boss allowed as how he could spare me for a couple of days if I would agree to do some overtime when I returned. Joyfully and reverently I agreed.

The flight was enjoyable. My impatience may have made it less so. The Captain and crew were alert and civil most of the time. I even got a free meal—that is almost a meal. I thought it was pretty good.

We bounced in at the airport and my heart beat faster and faster as we taxied up to the ramp. I rudely pushed off the plane as fast as I could which ruffled some of the more casual travelers, I recall. My chest was tight and throat dry as I reached the ground. The first thing I noticed was Old Glory waving there in the breeze. Behind it was a sign lauding the merits of a tried and proven airplane. To the right in big letters the name of my company stood out. As I looked my eyes clouded over and my heart was full with the realization that at last here it was, THE HOME OFFICE! You notice I can't write in the name of our Company since our manuals state it is cause for dismissal for unauthorized employees to write anything concerning the company. It is for security reasons, no doubt, besides we have skilled public relations personnel charged with such responsibility. They are highly paid experts that can place the Company in a favorable light where we other unqualified employees miss the true picture.

As if in a dream, I floated over to the entrance. You can imagine how great was my feeling as I entered. I suspect that entering the "Pearly Gates" will be almost as divine. The girl at the desk took all the data on my life, background, purpose, etc., and issued me a badge which gave me a free run. Just think of it, me, a free run of the Home Office. I hardly knew where to start. I just took in the departments as they came.

The first place I went through was the medical center. They were giving a pilot a going over. It seems the pilot had done a sloppy job on an instrument check so they had him and his wife answering the questions of a psychiatrist. He, the Psycho, weighed about two hundred sixty pounds and what with thick eye-glasses and short crew cut would have passed for a mental case himself had not I been informed he was a genius. I asked the nurse what they were trying to do. She advised me they were trying to help the pilot out. I guess they helped him out alright. Fired him the next day. Can't take chances with crazy people in our business. The Company gives them a letter of recommendation and a clear record when they help them out in this manner. From what I could gather, medical science is fast giving way to mental gymnastics. Since all human behavior is caused by impulses from the brain, then it stands to reason any errors in performance or judgment must necessarily stem from a faulty mind. Our Company benevolently gives each offender a free mental check before they fire him. Of

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**"At last here it was, THE HOME OFFICE! As if in a dream, I floated over to the entrance."**

course, the elementary caring for wounds from accidents is a part of the work also. However, the primary function is to find out what mental malfunction causes a worker to cut off a finger, step in a hole, or fly an airplane contrary to published rules and regulations.

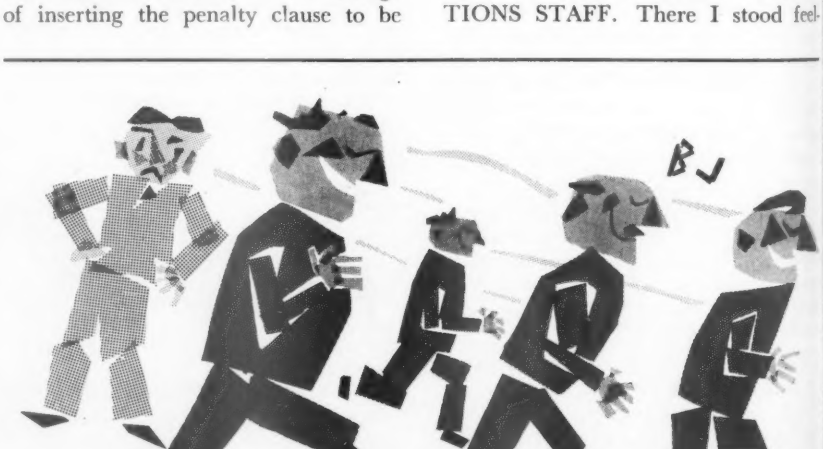
From our medical center I visited Industrial Relations. Now that is a place what is really ginning. Large office forces rustling papers, filing stuff, and figuring costs. My interview was with a pleasant moon-faced gent with large horn-rimmed glasses. I got a liberal education in "The rise and fall of the Masses." It seems this fellow had a rich background in labor relations and how to make them (labor) click. He allowed that our Company was cooperating one hundred per cent with the Government to curb inflation. The theory behind the action being, to keep wages at a bare minimum. This keeps the employees from going on wild spending sprees which causes food, clothing, and housing to soar in cost. He related that some unrealistic unions were hard to convince but the Government's wage freeze came to his aid. He had to stall one union for a year or more before the freeze set in. Real management weighs all possibilities.

My real love being in the operations end of things caused me to spend but little time in publicity (a story by itself), stores and accounting. I was eager to see reservations in full action. To me the true family spirit is here exemplified. Young men and women walk about jotting things on sheets of paper then rubbing them out. They are constantly munching sandwiches, drinking cokes, the while tweaking each other in pleasurable places. All in all, a nice place to work. There are lots of phones in "RES."—most of them lying idle off the hooks. Between candy bars, etc., a boy or girl will go over and advise the party waiting on the other end of one that space is all sold out for a week but to be at the airport at departure time since they are on a "go-show" basis. I learned a "go-show" takes the place of a "no-show" on the ships. It was explained to me that this procedure prevents anybody from overselling a ship and lessens squawks from passengers who thought they had space. Since our competitors can't possibly carry all the folks who want to fly, we get the overflow. We usually get a fair payload with this "go-show" business with no strain of booking and confirming space. The real family spirit displayed here, with the bright and intelligent employees displaying it, makes one glad to belong.

Possibly the greatest work done in the Home Office is by the Systems Manuals Department. There are twenty odd (I mean odd) such manuals which are referred to as "Bibles." One manual gives minute details on how to smooth a mishandled passenger. With guarded truth and routines as outlined, such passenger may well be happy he is alive when an agent gets through with him. Some of the cardinal rules: Blame the weather when the flight is late. If the passenger says the weather is good then tell him head winds are responsible and the Captain can make up the six hours on the next leg. Then Captain can or may (takes team work) stop a motor just fifteen minutes out and blame the late arrival on safety precautions. Always agree with a passenger, and get him off your neck. These are just some of the methods outlined in the manuals.

As I walked about watching the revisions of the twenty-odd manuals being prepared, I could not but help realize that truly this was a titanic task. One fellow was changing all the elevations of the airports throughout the system. Lowering some, raising others. This was for the pilots operation manual. Another was in charge of inserting the penalty clause to be planted in strategic places. "Failure to comply . . . will be subject to disciplinary action, dismissal or both." Another was putting our slogan on the bottom of each page. "Nothing in this manual shall take the place of good judgment on the firing line." That coupled with the penalty clause will give you an idea of what is meant by the firing line. Of course management's P&P (policies and procedures) manual is getting a constant rewriting. Sorta fluid, and changes daily to conform with conditions. I was told that only three revisions per manual per day are required for most manuals except management's P&P which might change in its entirety in one day. Since it contains Company policy of the highest scope, only top management gets a crack at looking at it. No fools there you can bet. What was Company policy yesterday does not necessarily hold today. Pretty slick, eh?

Well, I went through many other lesser departments and even looked down the dark hushed corridor where the vice presidents held forth. I did not want to abuse my privilege and loiter too long for fear someone would catch me looking that way. I broke it off and meandered down the hallway where huge gold lettering informed me I was near the SYSTEMS OPERATIONS MANAGER OF ALL MANAGERS. On another window in equally impressive lettering read DIRECTOR OF FLIGHT OPERATIONS STAFF. There I stood feel-




"Out of the Director of Flight Operation's Office swarmed a horde of tall, bronzed young airmen; the Buddy Club, composed of Chief Pilots, Check Pilots and Transition Pilots, congratulating each other on what a swell job each was doing."

ing all warm and good inside when out of "STAFF" swarmed a horde of tall bronzed young airmen. As they rushed by I could hear them all congratulating the other on what a swell job each was doing. I noticed quite a few were bald while others showed varying degrees of baldness. I wondered at it. Shortly after they went out I heard a series of deafening roars. Expecting to see a formation of airplanes taking off, I ran to the window and to my surprise saw these fellows cranking up motor bikes. They had donned leather jackets with zippers for numerous pockets. Huge leather belts studded with what appeared to be diamonds, rubies, sapphires, and other precious stones were around their waists. A jockey cap with goggles completed the fancy work and almost matched the chrome, lights, horns and saddle-bags, plus, of course, the cattails, of their mounts. Midst bursts of power, flying gravel, and fancy maneuvering they sped away over hill and dale. A pretty sight if I ever saw one.

About that time fifteen secretaries came out of "STAFF" and explained to me there was no fire drill. Just the Buddy Club composed of Chief Pilots, Check Pilots, Transition Pilots, and ground school instructor pilots, going for coffee. I had quite a talk with the secretaries as they drank cokes and munched candy bars. The bald heads of the Buddy Club was a way to designate seniority. The slicker the pate the more authority. They explained the tall youngest blond with the prominent adams apple and full head of hair was low man on the totem pole in the club. He looked like Abe Lincoln, age fourteen. The whole group reminded me of an order of the Trappist Monks I had seen once. True comradeship through thick and thin.

Suddenly there was a scurrying of secretaries. As they emptied the hall I soon learned why. Out of that other office "SYSTEMS OPERATION MANAGER OF MANAGERS" he came. Even before he started talking I knew he was a big man in the company—rapid fire on the dialogue, flashy in dress and busy. I was so stunned I froze in my tracks. I probably was trembling a bit. He stopped and in a hail fellow, well met fashion, slapped me on the back and says "Hi Buster, how's things and stuff?" I imagine it would be like General MacArthur speaking to an enlisted man. However, I have been around a bit so I screwed up my courage and answered "Fine sir, and the name is Elmer not Buster." He took this rebuff at getting my name

"Yessiree, Elmer, I shall strongly recommend to the Committee that you receive the Systems Yearly Highest Award. As proof of my good intentions, I herewith give you a Company calendar."

wrong like the big man he is and, at his laugh, the tightness in my voice and the neck hair took on their normal behavior. He told me how busy he was, the many problems of top management there in the Home Office. He made a point of the fact that no matter how busy he was he always had time to keep in touch with all his employees. His door had a latch string on it, (I failed to see one) for anyone with suggestions.

After about a half hour he eased up for breath and asked me who and what I was. Not being such a big man in the Company it only took me a sentence to inform of my name, job, and mission.

With that he exclaimed, "Well Buster, I call most boys Buster, no offense Buster, maybe you will join me in a tour of Flight Control?" "You see I always make the tour at least once a week when I am not too busy elsewhere on the system."

As we walked up the stair to where I guessed Control was, I got a quick trip around the system. Word pictures, of course, but fast, since he did not spend much time in one place. It left me a little confused like when a heavy sack of mail falls on you. I was getting more than I could handle in such a short time.

Before we came to a door lettered "Flight Control," I learned that responsibility for more than a hundred airplanes and many thousand people is no light chore. That to properly operate an Airline required that the Manager be busy. It was dawning on me that this was about the busiest man I had ever run across.

Some fellow darted into "Flight Control" ahead of us. We paused a few seconds at the door before opening as my guide (imagine the operations manager my guide) explained that Flight Control was the nerve center of operations. Decisions of the greatest magnitude were herein considered and on occasions made. As we entered half eaten candy bars were thrust into desks, coke bottles put out of sight and a general hum of extensive and intensive work prevailed.

Three or four fellows in charge of crews were working at a large four foot square of paper figuring out where to "deadhead" crews. Deadheading is the sending of crews as passengers to protect a flight or extra section. There must be lots of it on our Company from the looks of that sheet. Heavy thinking was going on in "Load Control" where they decide what will be carried and to where on which flights. Secretaries were writing things on huge boards that could be raised or lowered like window shades. I didn't know what all the people were doing but the Manager seemed to know what most of them were supposed to be doing. I could just feel the sparks of intelligence flying about. No lightweights around there. The Manager pointed out there was only one thing wrong. Planning had lost an airplane. It was still flying somewhere on the line but the records had somehow gotten lost so they would have to drop the plane from the fleet until they straightened the paper work out.

Being of coarse fibre and low intel-

*(Continued on Next Page)*

lect, I was grasping only a wee bit of what I was told and shown. I resolved to grasp as much as possible and decipher it later.

Next we entered the weather department. Word had proceeded us as there was no evidence of cokes and candy bars. Weather men were drawing weather maps, wind charts, isotherms, isobars, millibars, storm centers and other phenomenon.

I ventured to ask the purpose of this and was informed it was for the dispatchers use in long range flight planning of flight operations. I always thought they relayed it to the pilots in flight. I was assured that pilots in flight could see what weather they were encountering while the dispatcher, who holds joint responsibility with the pilot, had no such easy or sure go of it but must depend on the Weather Department for accurate, concise and frequent reports.

Thus, I was prepared to see something big in the dispatch wing of the Home Office. Description fails me to adequately convey the stupendous workshop I found—A Bee Hive of activity. This was one citadel of action. I was nonplussed at the tremendous effort displayed. There were four big desks. At each was a Dispatcher in various degrees of concentration. Some with knitted brows in the heaviest of concentration. Some with feet on desks studying manuals while others busy on the phones—two phones at a time not uncommon. The electrical equipment at each desk would be enough to make Alexander Graham Bell apologize. At least four phones graced each desk. There were radio receivers, inter-coms, and a long line tele-drop to other centers on the system. There were plenty of lights and switches the use for which I could not begin to remember. As we watched one dispatcher was cancelling flights while another next to him was originating flights. The central region dispatcher was yelling there was heavy ice on his sector as he went to the radiator to turn up the heat. For each dispatcher there was an assistant who in turn had two secretaries to aid in typing orders and instructions to pilots. These the dispatcher would initial and put them in a slot for radio to handle. Other clerks were putting flight movement reports on some more big boards like the ones we just saw in Planning. They were going up and down so fast the pulleys were smoking.

This was strictly a coffee operation here, no cokes for such heavy furious endeavor. All the complex problems of operation of flights are handled here.

The Manager took it all in at a glance. I suppose he saw I was turning a light green and on the way back to his office bought me a coke. It was most welcome at a time like that. All the way down the hall to his office I heard more of how busy he was. The duties of an operations manager requires keeping a finger on thousands of things in hundreds of towns. Again I was assured that no matter how busy he was, there was always some time to talk to the boys.

Suddenly I realized that his lot was not an easy one. I felt sorry for him. The old adage of "Adversity builds character" (and what a character) ran through my mind.

We went into his office where a sign read "I am the boss." I had somehow gathered as much but signs are reassuring. Other signs hung about the plush layout depicting a way of life. They admonished employees not to cuss the boss but to pull with him and do a job. All good stuff. He was still telling me how busy he was as I was admiring my surroundings.

The furniture was upholstered in real leather. I let my hand slide unnoticed over its rich surface. Huge maps gave mute testimony to the fact that he must be really busy riding herd on this vast network. He kept calling me Buster even though I had told him my name was Elmer Glutz several times.

After about an hour of his conversation, and two of his cigars, he startled me by asking, "Well Elmer, and what suggestion might you have for the Home Office?" It caught me off guard and I looked to see if someone else was about before I realized my name was Elmer. I did have an idea which was taking shape in my mind for the past two years. I felt a little foolish expressing it as it might seem ridiculous. He pressed me and I haltingly told him about it. The suggestion had to do with loading cargo. I thought it might save time to load the long haul stuff on first and the mail express and bags to come off at the next stop last. In this way the airplane would not have to be completely unloaded and reloaded at each stop. This seemed to me would save time on the ground. I know I explained it poorly but he was sharp as a tack and caught it right away. Gradually a light came into his eyes. He whipped out a pencil and paper and started figuring furiously. The light in his eyes became brighter. He jumped up ran to the window, pulled the blinds. Next he tip-toed to the door and flung it open as if to surprise any eavesdropper. Then he approached me, and while pumping my hand, started in.

He said, "Elmer, we have hit on the greatest thing in the industry since blind flying. Roughly this will save the Company a half million annually. This idea will put us in solid. You solid with me, me solid with the Board." He was all executive now and I could not help sharing his enthusiasm as he warmed up in his speech. He confidentially continued "Of course, Elmer, I'll present it to the Board as our joint idea—has a better chance of being adopted. They meet next month and you can bet I'll give it to them—and straight. It just so happens that I am on the suggestion committee. Yes sireee, Elmer, and you may be assured that you will not go unrewarded for your part in this idea. I shall strongly recommend to the committee that you receive the Systems Yearly Highest Award. (He was rapid fire now) and Elmer, my boy, that amounts to four dollars and sixty-eight cents. Not bad EH? As proof of my good intentions I herewith give you a Company calendar.

He whipped out a calendar all resplendent with color-photos of our far flung routes. A truly beautiful and valuable piece of merchandise. He was really wheeling now.

He continued "Of course, Elmer, getting you a slice of the incentive melon is impossible. That fund is reserved for top management. But top management always takes cognizance of meritorious service of the common employee." I wanted to know just where bottom mangement left off and top management started but dared not ask. There was no doubt left in my mind but that I was talking to top management. He said some more nice things about how top management had recognized the cost of living of some of its people and given a five per cent wage increase to cover the past five years. Others, who were overpaid to begin with naturally, were denied such increase.

It was about time for my flight back home. I didn't have enough money to stay all nite and told him so. Quick-like, he grabbed a phone. I hardly knew what to expect. At first I thought he was getting me a place to stay but it proved that he was checking on my flight's arrival. He found out it was an hour late due to ground delay. He made a note and said he would (when he found time) cure that delay condition. It was such a trying

*(Continued on Page 15, Col. 3)*

## Air Safety Forum

*(Continued from Page 5, Col. 3)*

R. C. Robson (AA)
ALPA Representative
Radio Technical Committee on Aeronautics

D. L. Phillips (TWA)
ALPA Committee Chairman
"Terrain Avoidance Problems"

W. Jensen (AA)
ALPA Committee Chairman
"Status of Radar in Airline Operation"

H. S. Weigel (CAP)
ALPA Representative
"Report on SC-63 of RTCA Studying Helicopter Operating Problems"

C. Daudt (AA)
ALPA Committee Chairman
"Reverse Propeller Project"

John Bosko (WCA)
ALPA Central Airline Safety Chairman
"Status of Safety Features on DC-3"

R. A. Young
ALPA-IFALPA Representative
"The International Federation of Air Line Pilots Associations and Their Program for Safety in Aviation"

J. C. Burn (PAA)
ALPA Committee Chairman
"ALPA Emergency Evacuation Study Committee Report"

### Plan Regional Air Safety Conferences

**Following up the ALPA Air Safety Forum held in Chicago in April will be several regional Air Safety Conferences to acquaint members with the subject matter discussed at the Forum.**

**To aid in the implementation of this projected program, the Home Office is presently preparing for distribution to regional Air Safety Representatives a "Conference Kit" containing a bound copy of Air Safety Forum reports, a short (30 min.) tape recording of Forum highlights, and a "Planning Guide" encompassing a suggested conference outline. The tape recording will contain excerpts from the reports to the Conference and from the lecture delivered by "Benny" Howard.**

**Local CAA Air Safety Agents will be invited as guests in the interest of expanding liaison between the federal regulatory agencies and the pilots.**

**Designed to disseminate information and increase general membership interest and participation in ALPA's air safety program, it is hoped that each Regional Air Safety Conference will attract a broad attendance. Plan to attend your regional Air Safety Meeting when the date is announced.**

## Terrain Avoidance

*(Continued from Page 10, Col. 1)*

a radar unit developed during World War II to provide tail gunners with the range of attacking aircraft.

The improved version has altitude warning gates of 500, 1,000, and 2,000 feet, any one of which the pilot can select by positioning a selector switch. The warning circuit operates visual and aural signals.

The lack of a permanent frequency assignment causes interference from other radio and radar transmissions. Consequently, the warnings are not considered reliable. Also, false warnings are sometimes received from certain cloud structures.

If the signal were reliable, it is believed from the tests already made that the warning is adequate, except under conditions requiring high rates of climb, for the pilot to either reverse course or climb over obstruction terrain. Other requirements are that the pilot has the unit set for maximum warning and takes immediate evasive action.

The barometric-type altimeter is subject to errors of such magnitude that there is a definite need for an absolute radar altimeter to provide reliable altitude information. The Navy APN-22 Radar Altimeter shows much promise of filling this need. However, the APN-22 has not been released for civil use. We can only recommend that this radar altimeter be released to the air carriers for service testing.

Perhaps the report on Barometric Altimeter Errors on Page 10 will not only refresh our memories, but will serve to substantiate the need for reliable altitude information.

## Complexities of Simplification

*(Continued from Page 8, Col. 3)*

we are not, we must be willing to accept complexity, and place the emphasis on reliability, rather than on complexity.

### Conclusion

It has been the purpose of this paper to indicate the complexities of the problem of simplification of aircraft, and to outline some of the considerations on which any sound approach to the problem must be based.

A differentiation must be made between needless complexity and the complexity that serves an essential purpose. Needless complexity can and must be eliminated.

Complex mechanical equipment, however, is essential in the modern airplane. Its use has increased the utility and safety of the airplane and has simplified the pilot's task. Without much of this equipment, situations would often arise with which the human operator could not cope. Mechanical simplicity gained at the expense of over-complicating the pilot's task is not simplification. The primary concern must be the efficiency of the man-machine combination.

If aviation is to continue to progress, we must be willing to accept the need for mechanical complexity, and the emphasis must be on achieving reliability rather than simplicity.

## The Home Office

*(Continued from Page 14, Col. 3)*

day for me. There was so much I had seen. I was confused and reeling with the magnitude of it all. As an excuse to leave I told the boss I had to go to the men's room and then get ready to catch the plane. I could absorb no more. I thought he was about to follow me but a secretary saved the day. She had a bunch of manual revisions for him to sign. Of all the duties he is burdened with, signing manual revisions are the heaviest. So we shook hands and he gave me a hearty handclasp in parting.

The rest that happened to me that day has no value worth relating. The trip home was like a pleasant dream since all my thoughts remained in the Home Office. As I lay my head back and relaxed, the boss' words kept ringing in my ears. "Buster my boy, I am a busy man—thousands of employees, hundreds of planes—signatures for manuals—I am awfully busy —always glad to chat with the people from the field—Systems yearly highest award—four dollars and sixty-eight cents—Company calendar—(I clutched it more firmly) I am very busy."

And then clear as a bell his parting words. I shall never forget them. "GO BACK TO YOUR DOMICILE REFRESHED. THERE MIDST PLEASANT SURROUNDINGS, GOOD WAGES, THE BEST OF WORKING CONDITIONS, AND SPLENDID OPPORTUNITY FOR ADVANCEMENT, DO A JOB. SO LONG, BUSTER."

I wondered how good things could get. I closed my eyes in sheer ecstasy. I had lived. I had been on hallowed ground. I had been to the HOME OFFICE.

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